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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/918,984	07/31/2001	Vivek R. Pradhan	CN 37,318-01	3817

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EXAMINER	
ARNOLD JR, JAMES	

ART UNIT	PAPER NUMBER
1764	9

DATE MAILED: 03/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-9

Office Action Summary	Application No.	Applicant(s)	
	09/918,984	PRADHAN ET AL.	
	Examiner	Art Unit	
	James Arnold, Jr.	1764	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 February 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

The obviousness-type double patenting rejections described in paper no. 4 have been withdrawn in view of the terminal disclaimers filed on February 24, 2003. The Examiner acknowledges and accepts the cancellation of claim 25 to overcome the 35 U.S.C. Section 102 rejection of the claim.

Claim Rejections - 35 USC § 112

Claim 17 recites the limitation "high-boiling" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 18 recites the limitation "high-boiling" in line 1 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexander (1) (USPN 6,024, 865) in view of Alexander (2) (6,059, 962).

Alexander (1) discloses a product that contains organic sulfur compounds of higher molecular weight than corresponding sulfur-containing compounds in the feedstock. See Abstract and Column 1, lines 21-24. The reference also discloses a feedstock comprising a mixture of hydrocarbons which includes olefins, and sulfur-containing organic compounds and nitrogen-containing organic compounds. See Column 1, lines 28-41 and figure 2. The reference also discloses a feedstock consisting essentially of material boiling between about 60 C and 345 C and containing sulfur. Column 7, lines 48-52. Furthermore, the reference discloses passing the feedstock through a bed of solid adsorbent to remove nitrogen and obtain an effluent which contains less of nitrogen-containing organic compounds than the feedstock. Column 14, lines 29-56. The reference furthermore discloses a first contacting stage in which the effluent is contacted with an acidic catalyst under conditions which are effective to convert a portion of the sulfur containing organic compounds to a sulfur-containing material of higher molecular weight through alkylation by the olefins, thereby forming an initial product stream. See Column 24, lines 1-5. The reference also discloses a subsequent contacting stage contacting at least a portion of the initial product stream with an acidic catalyst under conditions which are effective to convert a portion of the impurities to sulfur-containing material of higher molecular weight through alkylation by the olefins, thereby forming a subsequent product stream. See column 24, lines 12-20. The reference discloses a petroleum feedstock comprised of naphtha from a

catalytic cracking process. Column 1, lines 26-41. The reference also discloses the use of a solid phosphoric acid catalyst in at least one of the contacting stages. Column 21, lines 30-32 and Column 24, lines 1-5. The reference also discloses a process wherein the acidic catalyst of the subsequent contacting stage is comprised of a material which is prepared from an acidic catalyst by use in the first contacting stage, and the solid adsorbent is comprised of material which is prepared from the acidic catalyst by use in the first contacting stage and/or the second contacting stage. Column 13, lines 14-30. The reference also discloses a process whereby the feedstock is comprised of a hydrating agent in an amount which exhibits a capability to enhance performance of the catalyst and consisting of a hydrating agent having from about 2 to about 5 carbon atoms. Column 13, lines 14-34. The reference also discloses fractionating the subsequent product stream by distillation to provide at least one low-boiling fraction consisting of a sulfur-lean fraction and a high boiling fraction containing a sulfur-rich fraction. See Column 24, lines 58-63 and Column 26, lines 20-22. The reference also discloses a distillation endpoint and an initial boiling temperature in the range of from about 150 C to about 190 C. Column 24, lines 26-29. The reference also discloses a process whereby the high-boiling fraction has a distillation end point below 249 C. See Column 24, lines 30-31.

The Alexander (1) reference does not disclose a sulfur content up to about 4,000 or 5,000 parts per million and a nitrogen content up to about 2,000 parts per million. The reference also does not disclose a first contacting stage at elevated temperatures nor a second contacting stage at temperatures at least 10 C lower than an average of the elevated temperatures in the first connecting stage. The reference also does not disclose a naphtha from a thermal cracking process. The reference also does not disclose a process wherein the olefin content is at least

equal on a molar basis to that of the sulfur-containing organic compounds. The reference also does not disclose a process wherein the elevated temperatures used in the initial contacting stage are in a range of from about 100 C to about 235 C. Furthermore, the reference does not disclose a process wherein the temperatures in the subsequent contacting stage are at least 15 C lower than an average of the elevated temperatures in the initial contacting stage. The reference also does not disclose a fractionation resulting in a sulfur content less than 50 ppm. The reference does not disclose elevated temperatures for the initial contacting stage in the range from about 110 C to 220 C whereby the temperatures used in the subsequent contacting stage is at least 30 C lower than an average of the elevated temperatures in the initial contacting stage. The reference also does not disclose a process whereby one low-boiling fraction has a distillation end point and the high-boiling fraction has an initial boiling point such that the distillation end point and the initial boiling point are in the range from about 80 C to about 220 C. Furthermore, the reference does not disclose treating the high boiling fraction with a gaseous source of dihydrogen at hydrogenation conditions and in the presence of a hydrogenation catalyst. The reference does not disclose a process whereby the hydrogenation catalyst comprises at least one active metal, selected from the group consisting of the d-transition elements, each incorporated onto an inert support in an amount of from about 0.1 percent to about 20 percent by weight of the total catalyst. The reference does not disclose a process whereby the hydrogenation catalyst comes from the group consisting of cobalt, nickel, molybdenum, and tungsten. Finally, the reference does not disclose a process whereby the treatment of the high-boiling fraction with a gaseous source of dihydrogen employs at least one bed of hydrogenation catalyst comprising nickel and one or more metals selected from the group consisting of, molybdenum and tungsten, each

incorporated onto an inert support in an amount of from about 0.1 percent to about 20 percent by weight of the total catalyst.

The Alexander (2) (USPN 6,059,962) discloses a process whereby the olefin content of the feedstock is at least equal on a molar basis to that of the sulfur-containing organic compounds. Column 23, lines 59-61.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Alexander (1) to utilize a feedstock whereby the olefin content is at least equal to that of the sulfur-containing organic compound because both Alexander (1) and Alexander (2) disclose a process for sulfur removal and this removal would be made easier by utilizing a feedstock with a lower concentration of sulfur relative to olefin content. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a sulfur content up to about 4,000 or 5,000 parts per million and a nitrogen content up to about 2,000 parts per million because the Alexander (1) reference generally provides for a wide range of acceptable feedstocks. See Column 1, lines 17-41. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a first contacting stage at elevated temperatures and a second contacting stage at temperatures at least 10 C lower than an average of the elevated temperatures in the first connecting stage because the Alexander(1) reference discloses utilization of these stages under effective conditions. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a naphtha from a thermal cracking process because the Alexander (1) reference generally provides for a wide range of acceptable feedstocks. See Column 1, lines 17-41. It would have been obvious to one having ordinary skill in the art at the

time the invention was made to utilize a process wherein the elevated temperatures used in the initial contacting stage are in a range of from about 100 C to about 235 C because the Alexander (1) reference discloses utilization of stages under effective conditions. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process wherein the temperatures in the subsequent contacting stage are at least 15 C lower than an average of the elevated temperatures in the initial contacting stage because the Alexander (1) reference discloses utilization of stages under effective conditions. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a fractionation resulting in a sulfur content less than 50 ppm because the Alexander (1) and Alexander (2) references disclose the process of sulfur removal and it would be appropriate to utilize the process in any way which would result in effective sulfur removal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize elevated temperatures for the initial contacting stage in the range from about 110 C to 220 C whereby the temperatures used in the subsequent contacting stage is at least 30 C lower than an average of the elevated temperatures in the initial contacting stage because the Alexander(1) reference discloses utilization of these stages under effective conditions. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process whereby one low-boiling fraction has a distillation end point and the high-boiling fraction has an initial boiling point such that the distillation end point and the initial boiling point are in the range from about 80 C to about 220 C because the Alexander (1) reference discloses distillation end point and initial boiling point range of about 150 C to about 190 C and therefore any range which would be effective for sulfur reduction may be utilized. Finally, it would have been obvious to one

having ordinary skill in the art at the time the invention was made to treat the high boiling fraction with a gaseous source of dihydrogen at hydrogenation conditions and in the presence of a hydrogenation catalyst; utilize a process whereby the hydrogenation catalyst comprises at least one active metal, selected from the group consisting of the d-transition elements, each incorporated onto an inert support in an amount of from about 0.1 percent to about 20 percent by weight of the total catalyst; utilize a process whereby the hydrogenation catalyst comes from the group consisting of cobalt, nickel, molybdenum, and tungsten; and utilize a process whereby the treatment of the high-boiling fraction with a gaseous source of dihydrogen employs at least one bed of hydrogenation catalyst comprising nickel and one or more metals selected from the group consisting of, molybdenum and tungsten, each incorporated onto an inert support in an amount of from about 0.1 percent to about 20 percent by weight of the total catalyst because the Alexander (1) reference discloses the obtainment of low sulfur products through hydrotreatment in the presence of a catalyst.

Response to Arguments

Applicant's arguments concerning the 35 U.S.C Section 103 rejections have been fully considered but are deemed unpersuasive. Contrary to applicant's assertion, the Alexander (1) reference does disclose the utilization of contacting stages under effective conditions. See Column 24, lines 1-18. Furthermore, the Alexander (1) reference does not teach that alkylation can be achieved in stages provided that the conditions of alkylation are less severe in the initial alkylation stage than in a secondary stage but merely discloses that it may be achieved under such circumstances. See Column 8, lines 56-60. The reference also teaches that alkylation conditions may be optimized to achieve the desired alkylation of sulfur-containing aromatic

impurities and only suggests, but does not necessitate the use of mild alkylation conditions in the initial alkylation stage compared to the secondary stage. The reference, however, still leaves open other possibilities, such as a more severe initial alkylation stage compared to the secondary stage, because of its teachings of adjustment of conditions, including temperature, to achieve the desired alkylation effect. See Column 8, lines 43-60 and Column 6, lines 57-67. Therefore, the Examiner maintains that the teachings in the Alexander (1) reference would suggest to one having ordinary skill in the art the utilization of a first contacting stage at elevated temperatures and a second contacting stage at temperatures at least 10 C lower than an average of the elevated temperatures in the first contacting stage.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Arnold, Jr. whose telephone number is 703-305-5308. The examiner can normally be reached on Monday-Thursday 8:30 AM-6:00 PM; Fridays from 8:30 AM – 5:00 PM with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3014 for regular communications and 703-305-3014 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.

Walter D. Griffin
Primary Examiner

ja
March 20, 2003